

# MONTHLY WEATHER REVIEW.

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The MONTHLY WEATHER REVIEW is based on data from about 3500 land stations and many ocean reports from vessels taking the international simultaneous observation at Greenwich noon.

Special acknowledgment is made of the data furnished by the kindness of cooperative observers, and by R. F. Stupart, Esq., Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Director Meteorological Office, London; Maxwell Hall, Esq., Government Meteorologist, Kingston, Jamaica; Rev. L. Gangotiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

As far as practicable the time of the seventy-fifth meridian is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

## FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

### IN GENERAL.

December usually marks the establishment of winter types of atmospheric pressure over the Northern Hemisphere. The great interior of Asia becomes the seat of the principal so-called permanent winter high area of the hemisphere, and a high pressure area builds up over the west interior of the North American Continent. Permanent winter low areas are formed over Bering Sea and Iceland. A seasonable distribution of the greater areas of high and low pressure gives to the Northern Hemisphere seasonable weather. Irregularities in the distribution and character of these areas result in types of unseasonable weather thruout the hemisphere.

In December, 1907, the winter distribution of pressure did not become well established over the Northern Hemisphere. In the Asiatic area the barometer was high during the second decade and fluctuated rapidly during the balance of the month. Over Bering Sea the barometer was lowest from the 17th to the 22d, and was abnormally high during a portion of the first decade and at the close of the month. Over the Hawaiian Islands the barometer was high from the 1st to 6th, 8th to 15th, 17th to 20th, 26th and 27th; on other dates it was below normal. In the Iceland area pressure continued low during the first two decades, and was relatively high after the 20th. Over the Azores pressure was high during the first half and generally low and fluctuating during the second half of the month. The irregularities presented reveal the associated causes of unseasonable types of weather experienced during the month.

In the United States the month was unusually mild and free from severe cold periods. Precipitation was in excess along the Atlantic and Gulf coasts, in parts of the Lake region, and in a belt extending from the lower Missouri Valley to the north Pacific coast; elsewhere it was deficient. The month opened with a period of fair, cool weather. From the 3d to the 7th a barometric depression occupied the north Pacific coast. Moving eastward over the central valleys and the Lake region during the 8th and 9th a disturbance reached the Atlantic coast on the 10th. The second storm period set in over the north Pacific coast on the 9th and continued until the 13th. The storm area extended over the Rocky Mountain districts from the 10th to the 14th, the central valleys and the Lake region from the 11th to the 15th, and the Atlantic coast States from the 14th to the 16th. Gales were severe on the north Pacific

coast from the 10th to the 13th, and on the middle Atlantic and New England coasts on the 14th and 15th. On the latter-named dates heavy snow fell from the southern Lake region over New England. Following this disturbance there was a period, lasting about a week, of comparatively fine weather generally over the country. After the 20th weather changes were rapid. Pressure fluctuated on the north Pacific coast and toward the close of the month was low on the middle and south Pacific coasts. A storm of marked strength advanced eastward over the central valleys to the Atlantic coast from the 22d to the 24th, attended by heavy rain in the Eastern and Southeastern States, and by heavy snow in parts of the middle and north-central valleys. The month closed with a severe storm passing off the north Atlantic coast.

BOSTON FORECAST DISTRICT.\*

[New England.]

The first week was colder and the balance of the month warmer than usual. Snowfall was confined to the first half of the month, the greatest fall being on the 14-15th. Severe storms occurred on the 14th, 23d, 27th, and 30-31st. Timely warnings of the storms resulted in the saving of much property, and doubtless were the means of saving numerous lives. There were no storms without warnings.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.\*

[Louisiana, Texas, Oklahoma, and Arkansas.]

The month was warm and precipitation was unevenly distributed. No cold-wave or storm warnings were issued. Warnings issued for frost or freezing temperature were justified. No extensive storm occurred.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.\*

[Kentucky and Tennessee.]

Temperature was slightly above normal, and precipitation was about normal and well distributed; a noticeable deficiency in precipitation occurred, however, in western Tennessee. Two storms in the third decade of the month were attended by heavy rain and high wind. No cold-wave or other special warnings were issued.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.\*

[Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Montana.]

Mild temperatures prevailed and general cold-wave warnings were neither ordered nor required. No storms of a serious

character occurred. Precipitation was fairly well distributed. A heavy snowstorm occurred over the southern Lake region on the 14th. Snow warnings were issued on that date.—*H. J. Cox, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.\*

[Wyoming, Colorado, Utah, New Mexico, and Arizona.]

Storms were fewer than usual. Precipitation was below, and temperature above normal. Low temperatures prevailed in southwestern Wyoming from the 16th to the 21st, and at high level stations in Colorado from the 17th to the 21st.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.†

[California and Nevada.]

Normal conditions prevailed. On the 4th, 10th, 19th, and 24th depressions appeared on the north Pacific coast that were attended by periods of unsettled weather, rain, and high winds. There were numerous frosts, most of which were forecast.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.†

[Oregon, Washington, and Idaho.]

December was an exceptionally stormy month. The most severe storm occurred on the 12th, when a barometer reading of 28.84 inches and a wind velocity of 96 miles an hour were registered at North Head, Wash. On the 23d a wind velocity of 82 miles was noted at Tatoosh Island, Wash. Storm warnings were ordered in advance of each gale and casualties were light.—*E. A. Beals, District Forecaster.*

### RIVERS AND FLOODS.

While there were no floods of great consequence during the month, there were a number of marked rises in the rivers of the Atlantic and Pacific States that were sufficient to make the month a fairly active one in those localities. The heavy rains of the 10th over New England and the Middle Atlantic States were followed by general rises in the rivers, but not to above flood stages, except in some of the Maine rivers.

In the Hudson and lower Mohawk rivers, however, the conditions were so threatening that it became necessary to issue an advisory warning that the flood stage would not quite be reached. This warning accomplished its purpose, and much expense that would otherwise have been unnecessarily incurred was saved.

The next rise in the rivers of the Atlantic States was caused by the heavy and general rains of the 14th, and flood stages were general in the rivers of the Carolinas. Warnings were issued on the 14th wherever necessary. The southwest storm of the 21st–23d was attended by heavy rains over the Atlantic States on the 22d and early morning of the 23d. Flood warnings were issued generally on that and the following day. This flood, like that of the middle of the month, was moderate in character and no damage of consequence was done.

Heavy rains in eastern Texas on the 21st and 22d filled the Sabine River to the bank-full stage and the Trinity River rose 4 or 5 feet above the flood stage from the 24th to the 30th. Warnings were issued on the 22d.

The heavy rains over the north Pacific coast States during the last decade of the month caused a flood in the Willamette Valley, with stages from 2 to 8 feet above the flood stage, the greatest excess occurring at Albany, Oreg. Warnings were first issued on the 23d and were repeated daily thereafter until the flood subsided. The crest stages reached agreed very nearly with those that had been forecast, and not much damage appears to have been caused by this flood. Rainfall chart and hydrographs for this flood are shown herewith. (See figs. 1 and 2.)

\* Morning forecasts made at district center; night forecasts made at Washington, D. C.

† Morning and night forecasts made at district center.

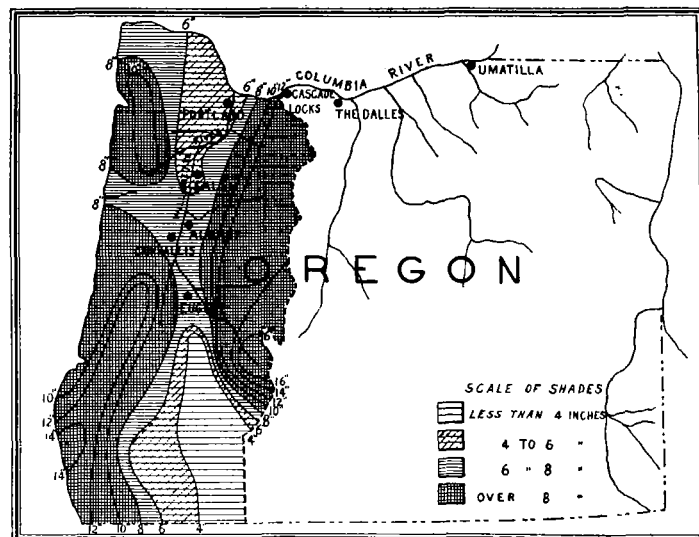


FIG. 1.—Precipitation in western Oregon from December 17 to 27, 1907, inclusive.

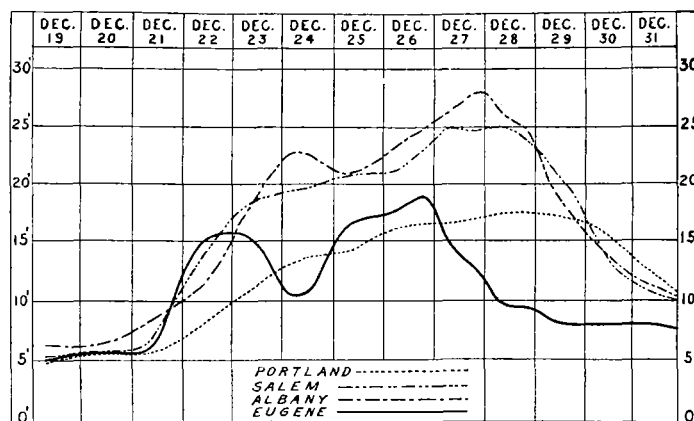


Fig. 2.—Hydrographs for four stations on the Willamette River, December 19 to 31, 1907, inclusive.

### ICE.

At the end of the month the Missouri River was closed as far south as Pierre, S. Dak., where it froze over on the 21st. Navigation closed on the 1st, and at the end of the month there were 4 inches of solid ice, much less than at the end of December, 1906. Floating ice was observed as far south as Boonville, Mo., from the 19th to the 23d, inclusive. At Bismarck, N. Dak., the river froze over on the 3d, and navigation was closed.

The Mississippi River was closed as far south as Prairie du Chien, Wis., but remained open below, except at Leclaire, Iowa, where it closed on the 31st. The southern limit of floating ice was at Hannibal, Mo., where navigation was practically closed on the 1st, altho ice did not appear until the 18th. During December, 1906, ice was observed as far south as Cairo, Ill.

There was floating ice in the Allegheny River on numerous dates, but none was observed in the Ohio River below Corapolis, Pa.

An ice gorge formed at the Douglas Avenue Bridge over the Arkansas River at Wichita, Kans., on the 19th, but it soon past out. The Kansas River was also closed above the bridge at Manhattan, Kans., from the 18th to the 26th, inclusive.

There was considerable ice in the rivers of New England and the Middle Atlantic States, but, as a rule, much less than during December, 1906. Navigation at Albany, N. Y., on the Hudson River, was closed on the 6th, when the river was filled with floating ice. The Connecticut River at Hartford,